

What is claimed is:

1. A surgical device, comprising:

- a) a tubular member having proximal and distal ends;
- b) a first control element wire extending through said tubular member and having proximal and distal ends;
- c) at least one second control element extending through said tubular member and having proximal and distal ends; and
- d) a handle comprising
 - (i) a stationary member,
 - (ii) a first lever coupled to said proximal end of said at least one second control element and linearly movable relative to said stationary member to effect relative proximal and distal movement of said at least one second control element relative to said tubular member, said first lever being lockable and unlockable in position relative to said stationary member,
 - (iii) a rack member linearly movable within said handle and fixedly coupled to said proximal end of said first control element,
 - (iv) a second lever rotatably coupled to said first lever,
 - (v) a pinion rotatable coupled to the second lever, and
 - (vi) a spring element biasing said pinion against said rack member,

such that when said second lever is rotated relative to said first lever, said pinion effects substantially linear movement of

said rack member and thereby causes proximal and distal movement of first control element relative to said tubular member.

2. A surgical device according to claim 1, wherein:

said handle assembly defines a housing and said handle assembly further comprises a constant force spring provided in said housing and having an end coupled to said first lever, such that a substantially constant force is provided to said lever when said lever is moved proximally relative to said stationary handle.

3. A surgical device according to claim 1, further comprising:

e) an end effector assembly at said distal end of said tubular member, said distal ends of said at least one second control element being coupled to said end effector assembly.

4. A surgical device according to claim 1, wherein:

said end effector assembly includes a pair of clamping jaws.

5. A surgical device according to claim 4, further comprising:

f) a pusher element located at said distal end of said first control element,

said end effector assembly including an opening through which said pusher element is adapted to advance a clip located in said tubular member and distal of said clip pusher between said pair of clamping jaws.

6. A surgical device according to claim 1, wherein:

said tubular member, said first control element, and said at least one second control element are each flexible.

7. A surgical device according to claim 6, wherein:

said tubular member has a length of at least 150 cm to 250 cm.

8. A surgical device according to claim 6, wherein:

said tubular member has an outer diameter which does not exceed 3.2 mm.

9. A surgical device according to claim 1, wherein:

said rack defines a plurality of teeth, each of said teeth having a proximal angled surface.

10. A surgical device according to claim 1, wherein:

said tubular member, said first control element, and said handle assembly are adapted such that when said second lever is rotated relative to said first lever a distal pushing force of at least 500 grams is provided by said distal end of said first control element.

10010912 120600

11. A surgical device, comprising:

- a) a tubular member having proximal and distal ends;
- b) a first control element wire extending through said tubular member and having proximal and distal ends;
- c) at least one second control element extending through said tubular member and having proximal and distal ends; and
- d) a handle comprising
 - (i) a stationary member,
 - (ii) a first lever coupled to said proximal end of said at least one second control element and linearly movable relative to said stationary member to effect relative proximal and distal movement of said at least one second control element relative to said tubular member,
 - (iii) a first spring biasing said first lever proximally relative to said stationary member,
 - (iv) a second lever rotatably coupled relative to said first lever and coupled to a proximal end of said first control element, and
 - (v) a second spring biasing said second lever away from said first lever,

wherein when said first lever is moved against the bias of said first spring said at least one second control element is pulled into tension, and

when said second lever is moved against the bias of said second spring said first control element is pushed into compression.

12. A surgical device according to claim 11, wherein:

said first spring is a constant force spring.

13. A surgical device according to claim 11, wherein:

e) an end effector assembly at said distal end of said tubular member, said distal ends of said at least one second control element being coupled to said end effector assembly.

14. A surgical device according to claim 13, wherein:

said end effector assembly includes a pair of clamping jaws.

15. A surgical device according to claim 14, further comprising:

f) a pusher located at said distal end of said first control element,

said end effector assembly including an opening through which said pusher is adapted to advance a clip located in said tubular member and distal of said clip pusher between said pair of clamping jaws.

16. A surgical device according to claim 11, wherein:

said tubular member, said first control element, and said at least one second control element are each flexible.

17. A surgical device according to claim 16, wherein:

said tubular member has a length of 150 cm to 250 cm.

18. A surgical device according to claim 11, wherein:

said tubular member, said first control element, and said handle assembly are adapted such that when said second lever is rotated relative to said first lever a distal pushing force of at least 500 grams is provided by said distal end of said first control element.

19. A surgical device, comprising:

- a) a tubular member having proximal and distal ends;
- b) at least one first control element extending through said tubular member and having proximal and distal ends; and
- c) a handle assembly comprising
 - (i) a stationary member,
 - (ii) a first lever linearly movable relative to said stationary member and coupled to said proximal end of said at least one first control element, wherein movement of said first lever relative to said stationary member effects relative proximal

and distal movement of said at least one first control element relative to said tubular member,

(iii) a first spring biasing said first lever proximally relative to said stationary member, and

(iv) a catch system which locks said first lever relative to said stationary member when said first lever first lever is moved against the bias of said first spring with a predeterminable amount of force, said catch system including a manual release which unlocks said first lever relative to said stationary member.

20. A surgical device according to claim 19, wherein:

said first spring is a constant force spring, and

said catch system includes,

(A) a locking tooth coupled to said first lever,

(B) a lever including engagement structures engageable with said locking tooth,

(C) a mount immovably coupled relative to said first lever,

(D) a latch movably coupled to said mount, said proximal end of said at least one first control element being coupled to said latch, and

(E) a second spring biasing said latch proximally relative to said first lever,

said latch including a ramp surface which operates to prevent locking engagement between said locking tooth and at least one

said engagement structures when said latch is in a proximalmost position relative to said first lever,

said mount and said latch having a cam engagement, such that when said lever is moved proximally to cause tension in said second spring to be greater than tension in said first spring, said lever moves proximally relative to said latch, said latch is moved such that said ramp surface fails to prevent locking engagement between said locking tooth and said at least one of said engagement structure, and at least one of said engagement structures lockingly engages with said locking tooth to immobilize said lever relative to said stationary handle.

21. A surgical device according to claim 19, further comprising:

d) a second control element extending through said tubular member and having proximal and distal ends,

wherein said handle further comprises

(v) a second lever rotatably coupled relative to said first lever and coupled to a proximal end of said second control element, and

(vi) a second spring biasing said second lever away from said first lever,

wherein when said second lever is moved against the bias of said second spring said second control element is pushed into compression.

22. A surgical device according to claim 21, further comprising:

e) an end effector assembly at said distal end of said tubular member, said distal ends of said at least one first control element being coupled to said end effector assembly.

23. A surgical device according to claim 22, wherein:

said end effector assembly includes a pair of clamping jaws.

24. A surgical device according to claim 23, further comprising:

f) a pusher element located at said distal end of said second control element,

said end effector assembly including an opening through which said pusher element is adapted to advance a clip located in said tubular member and distal of said clip pusher between said pair of clamping jaws.

25. A surgical device according to claim 19, wherein:

said tubular member and said at least one first control element are each flexible.

26. A surgical device according to claim 25, wherein:

said tubular member has a length of 150 cm to 250 cm.